Cumulative impacts may appear to be individually minor but are collectively significant and must be documented with both direct and secondary impacts of a proposed project.

Today, secondary and cumulative impacts are getting more attention from agency reviewers because their effects can last longer and cause more damage than direct impacts. A bridge spanning a stream may seem like a single direct impact, but the secondary and cumulative impacts of the bridge may be much more dramatic over time. If the bridge improves access to undeveloped lands, it may lead to more development, driveways and parking lots, and thus stormwater runoff. A water or sewer line extension may similarly lead to additional development and stormwater runoff, thereby degrading water quality and threatening aquatic species. Thus, even though a construction project's "footprint" may be small, its secondary and cumulative impacts can affect aquatic species for miles downstream and for years to come.

## SCI GUIDANCE FOR LOCAL GOVERNMENTS

The N.C. Department of Environment and Natural Resources (DENR) is developing specific guidelines for evaluating secondary and cumulative impacts (SCI). The purpose of these guidelines is to define and identify methodologies for assessing SCIs. The SCI guidance should be used when preparing SEPA documents for the DENR. See http://www.enr.state.nc.us/ then click on DENR Laws & Regulations under "Rules, Policies & Regulations."

The N.C. Department of Transportation (DOT) has a document titled "Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina." See http://www.ncdot.org/doh/preconstruct/pe/ ICI_Guidance.html.

The N.C. Wildlife Resources Commission's "Guidance Memorandum to Address and Mitigate Secondary and Cumulative Impacts to Aquatic and Terrestrial Wildlife Resources and Water Quality" can be found at http://www.ncwildlife.org/pg07_WildlifeSpeciesCon/pg7c3_impacts.pdf.

## ASSESSING IMPACTS ON LISTED SPECIES

The presence of listed species in the project area also adds to the complexity of the environmental review and may lengthen its timeline. In aquatic habitats, listed species may include freshwater mussels, fish or crayfish. Because mussels generally move only short distances, the anticipated presence of rare mussels may require the following:

**A mussel survey.** A mussel survey is performed by a biologist who physically inventories the mussel populations over a section of stream. The process takes time and patience. Few biologists are licensed in mussel identification, and surveys must be conducted under optimal conditions —low, clear water which is most often encountered during the summer and early fall. Recent rain storms and stream turbidity may delay a mussel survey. To find a list of biologists authorized by the N.C. Wildlife Resources Commission, call the Habitat Conservation Program, 919-707-0224.

Whenever a federally listed species is present, a thorough assessment of direct, secondary and cumulative impacts will help in the preparation of a biological assessment. A biological assessment is an important component of the U.S. Fish and Wildlife Service's "section 7 consultation," a review process required by the Endangered Species Act when a project that is funded or permitted by the federal government affects federally threatened or endangered species. A biological assessment summarizes the impacts of a project on an endangered or threatened species and details the steps that will be taken to minimize or eliminate those impacts.

**Additional conservation measures.** The U.S. Fish and Wildlife Service may find that measures are needed to address the secondary and cumulative impacts of new infrastructure projects. Some state and federal water-quality programs require riparian buffers or other stormwater controls, but the focus of those programs is on pre-